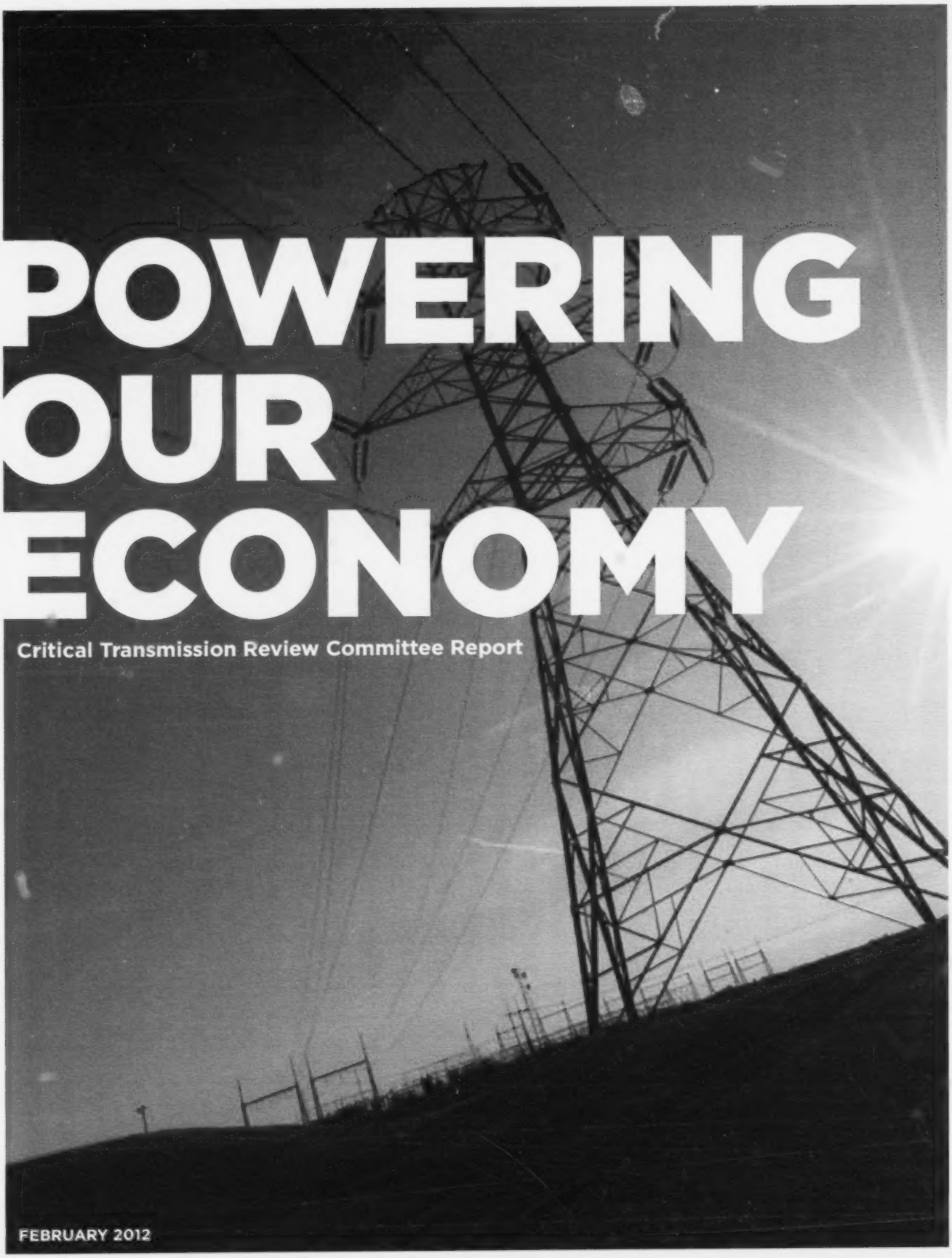


POWERING OUR ECONOMY

Critical Transmission Review Committee Report

FEBRUARY 2012

TABLE OF CONTENTS

Executive Summary 2

Introduction 6

Powering the Economy 7

Alberta's Electricity System 9

Development of the North-South Transmission System 15

Alberta Government's Policy Suite 17

AESO's Current Forecast and Needs Assessment 19

What We Heard 21

Analysis 25

Recommendations 27

References 30

Appendices 31

EXECUTIVE SUMMARY

The current transmission system has not kept pace with Alberta's buoyant economy and growing electricity consumption. As a result, the existing transmission system is congested, ageing, and inadequate to meet the future electricity needs of Alberta.

Electricity is an enabler of economic development in Alberta and a robust, reliable and efficient electricity transmission system is required. Transmission infrastructure is a public good that must be available in advance of need, enable addition of new generation and be capable of meeting long-term load growth throughout the province.

In December 2011, the Alberta Government struck a committee to review the issue of critical north-south transmission lines. Specifically, the committee was charged with examining the reasonableness of the Alberta Electric System Operator forecasts, its selection of High Voltage Direct Current (HVDC) technology, and the timing of any required north-south transmission reinforcement.

The Alberta Government also requested that industry and community stakeholders be consulted on the need for changes to Cabinet powers for critical transmission infrastructure projects detailed in the Electric Statutes Amendment Act, 2009 (formerly Bill 50).

Brian Heidecker chaired the committee which included Dr. Roy Billinton, Dr. Joseph Doucet, and Henry Yip. Together, they consulted with over thirty Alberta based organizations representing landowners, municipalities, electricity producers, and consumer associations.

Three distinct perspectives and opinions emerged on the issue of transmission reinforcement:

- it is not required,
- the Alberta Utilities Commission should consider the need and,
- it is required as soon as possible.

The committee appreciates the efforts of all who participated in this process and the thoughtful views that were made available to the committee.

What many people agreed on is that Alberta's population and GDP will likely continue to grow as national and international businesses invest in Alberta's resources. Throughout the consultation, it was clear that Albertans want the provincial government to base decisions related to north-south electrical transmission on the long term strategic needs of all Albertans.

The committee found that AESO's economic, load, and generation forecasts for Alberta are reasonable. The data, methodology and intellectual rigour used to determine future demand for electrical transmission in Alberta is credible and robust. The AESO has access to exclusive statistics from real time data points across the provincial grid to analyze the transmission system as well as appropriate information on load and generation development. The committee believe that the AESO's team has greater specialized knowledge of the Alberta electric demand than any other single organization and also consults widely with stakeholders and external forecasting experts to vet its approach and results.

Specifically, AESO's load forecast is based on global, regional and local considerations and is closely correlated to Alberta's GDP which is a recognized global measure for the predictable use of electricity.

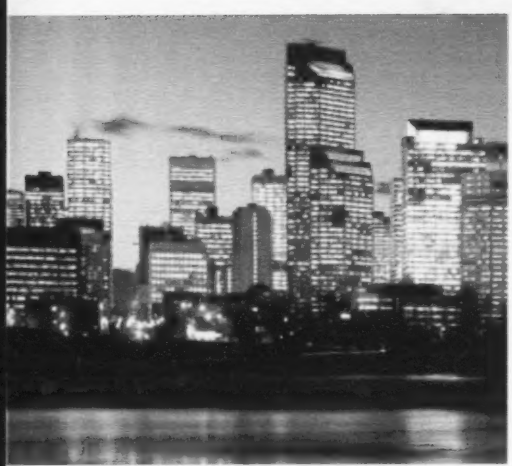
The generation forecast recognizes the uncertainties in the individual corporate development investment plans. As generation is investor driven the AESO estimates the future installed generation capacity based on each business case. The AESO has access to this confidential investment information to predict future generation and develop transmission plans based on these scenarios.

The AESO also monitors and measures the flow of electrical energy in and out of Alberta. Alberta has one of the fastest growing economies in North America and historically imports more electrical energy than it exports. The province is at a competitive disadvantage in the economics of exporting electricity. Exporting where thermal energy competes against hydro and US gas fired generated energy simply is not economically viable.

The committee has come to the following conclusions:

1. **The committee finds that AESO's economic, load and generation forecasts for Alberta are reasonable.**
2. **The committee agrees that the AESO's recommendation to proceed with the development of two 500 kV transmission lines is reasonable.**
3. **The committee has determined that the AESO's decision to use HVDC technology is reasonable.**
4. **The committee finds it reasonable for the Alberta Government to proceed with the development of the two 500 kV HVDC transmission lines as soon as possible.**
5. **The committee recommends the government amend the Electric Statutes Amendment Act, 2009 legislation.**
6. **The committee understands that there will be rate increases associated with the development of north-south transmission system reinforcement and recommends the AUC consider options that will mitigate the impact to consumers.**
7. **The committee encourages the use of the competitive procurement process for future critical transmission infrastructure projects.**

If one of the greatest scientific achievements of the nineteenth century is the discovery of electricity, then perhaps the greatest achievement of the twenty first century is making use of it.



Electricity is pervasive in everything we do and Alberta based businesses consume a great deal of it.

Electrical energy is the enabler of so many things we do in life. It lights up our homes, heats schools, serves hospitals and health centres, controls farm equipment, and powers industries. Without reliable electricity, Alberta's economy will slip and the province's ability to compete in the global marketplace will be challenged.

An adequate supply of electricity is necessary for everything we do in our modern society. That is why this essential resource must be ready to serve Albertans and their businesses today and in the future. Without an electrical system that can be depended on, Alberta's economy and quality of life could be put at risk.

In the middle of the last century the leaders of our province had the wisdom to build the foundation of an electrical system with the capacity and the reliability that has served us well and supported Alberta's impressive growth.

Now is the time to think strategically and plan carefully so we can move forward with confidence, knowing that the electrical system will power our economy for the foreseeable future.

It is a time to make the decisions that will set up future generations to continue to lead prosperous, productive lives in Alberta.

INTRODUCTION

In 2003, the Alberta Electrical System Operator (AESO) proposed high voltage transmission reinforcement between the Edmonton and Calgary regions. Since that time, the issue of increasing Alberta's electrical transmission capacity has been a subject of considerable interest from consumers, industry, government, citizens and regulators.

The Task

On December 6, 2011 the Alberta Government tasked an independent committee to review the reasonableness:

- of the AESO forecasted need for robust electrical transmission,
- of the use of High Voltage Direct Current technology, and
- of the timing of the planned north-south transmission lines as it relates to reliability, line losses, operational flexibility, costs and long-term development[1].

The Alberta Government also asked the committee to consult with industry leaders and community stakeholders on any proposed changes to the cabinet powers and the north-south critical transmission infrastructure projects detailed in the *Electric Statutes Amendment Act, 2009* (formerly Bill 50).

Chaired by Brian Heidecker, the committee comprised of Dr. Roy Billinton, Dr. Joseph Doucet, and Henry Yip invited 38 organizations representing landowners, municipalities, electricity producers, and consumer associations[2]. Thirty organizations representing thousands of Albertans actively participated in the review. The committee also considered submissions from other interested Albertans.

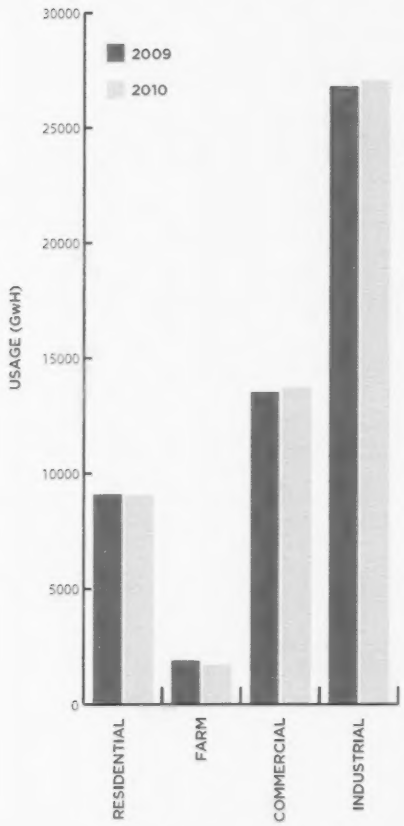
The committee's mandate focused on investigating the need and urgency of the new transmission infrastructure between the two regions to support Alberta's robust economy now and in the future.

1 See Appendix A for Ministerial Order

2 See Appendix B for invitation and consultation questions

POWERING THE ECONOMY

Per capita, Alberta uses more electrical energy than any other province in Canada, primarily due to our large industrial base.



Source: ERCB
Does not include line losses and electricity generated on-site

In fact the majority of the electricity used in Alberta is by industrial consumers (large manufacturers, oil and gas firms, etc.) Other consumers include commercial (retail outlets, schools, businesses, etc.), residential (homes, apartments, etc.) and farms.

Whether it's through the increasing residential use of home electronics and appliances or for industrial purposes such as the demand to power pipelines to move bitumen from northern Alberta to Texas, move conveyors in a manufacturing process or run the milking machines on a dairy farm, the fact is that Alberta's electricity demand is growing. Further, Alberta's social and economic well-being currently relies on an electrical energy transmission system that was largely built in the 1980's and reached capacity in the late 1990's.

The current transmission system has not kept pace with Alberta's rising economy and growing electricity consumption. As a result, the existing transmission system is congested, ageing, and results in excessive energy loss.

> *"Without it, our pipeline can't run"*
>
> *Vince Kostesky, VP TransCanada*

As the province's population continues to grow, so does Alberta's demand for electrical power, which is forecast to increase by about 2.5 percent each year.[3] In order to power our economy in 2027, we will need twice the amount of electricity we currently consume.[4]

Preparing for the Future

At one time or another most people have experienced the inconvenience of a car battery failing unexpectedly on a cold winter morning or have had to stop what they are doing to recharge a smartphone before the battery runs out. The impacts of these events range from mild inconvenience to lost business and productivity.

3 Alberta Electricity System Operator (AESO)

4 Provincial Energy Strategy

At another level, the ice storms in eastern Canada in 1998 and the spring snow storm that took out one transmission line in southern Alberta in 2010 illustrate what can happen if the transmission system "fails".

The 1998 ice storm caused massive damage to trees and electrical infrastructure in eastern Ontario, Southern Quebec and New Brunswick. The two inches of ice deposited through the storm brought down trees, roofs, and transmission infrastructure leading to widespread long-term power outages. Millions of homes and businesses were in the dark for periods varying from days to weeks, leading to more than 30 fatalities. Public transit, water systems, tunnels, bridges and roadways were shut down in large urban areas as an unprecedented effort to reconstruct the power grid was underway. The loss of electricity also affected many farmers, as they could no longer provide water or adequate ventilation to barns, leading to the loss of many animals.

Another example of the impact on a constrained or congested electrical system is evident in the $500 million ratepayers absorbed after the snow storm in Southern Alberta in 2010. The storm damaged 30 transmission towers connected to the Sheerness generation facility. Electricity prices rose for all consumers in Alberta as higher-cost, gas-fired electricity was called upon as a substitute for low-cost, coal-fired electrical power that could not be used as a result of the transmission disruption. In some areas electricity could not be restored for three days resulting in lost revenues estimated at $240 million.

In the case of electricity transmission, the costs associated with an overstressed system or disruptions in service are often not appreciated until it is no longer available.

Power Shift

It has become increasingly clear that the availability of an economic and reliable supply of electricity is an integral element of modern society.

Many new innovations contributing to our quality of life are tied to electrical energy use.

From a residential perspective, without electricity, forced air furnaces or other heating systems in our homes can't function.

Likewise, from an industrial perspective 50 years ago, when the power went out on a farm, it affected a couple of light bulbs and a water pump.

Today electricity and computer systems manage the daily operations of livestock operations whether it is regulating the heat in a hog or poultry barn or programming the timing and operations of milk machines on dairy farms.

ALBERTA'S ELECTRICITY SYSTEM

Physical Assets

Electricity is an enabler of economic development in Alberta. To this end a robust, reliable and efficient electricity transmission system is required. Transmission infrastructure is a public good that must be available in advance of need, enable addition of new generation and be capable of meeting long-term load growth throughout the province.

Alberta's Provincial Energy Strategy 2008

The electricity industry is made up of four distinct but related segments as illustrated below:

Generation **Transmission** **Distribution** **Consumer**

Generation

Generation is the first step in the process of providing electricity to consumers. Almost 45 percent of Alberta's electric generating capacity is from coal fueled generators, and approximately 40 percent from natural gas fired generators. Alberta also uses water, wind, biomass and waste heat to generate electricity.

Because electric energy cannot be stored efficiently, generating plants produce it in real-time, as Albertans use it. This means that at certain times of the day there can be a higher or lower demand for electricity in the province. When there is increased demand for electricity, operating generators must respond or additional generators must be brought into service in order to produce the exact amount of electrical power required.

Types of Generation

The following table illustrates Alberta's installed generation and interconnection capacity as of December 2011.

Alberta's Installed Generation and Interconnections Capacity	
Generating Capacity	**Megawatts (MW)**
Coal	6,185
Gas	5,233
Hydro	900
Wind	893
Biomass	354
Waste Heat	61
Fuel Oil	12
Subtotal	**13,638**
Interconnections Capacity	**Megawatts (MW)**
British Columbia	750
Saskatchewan	150
Subtotal	**900**
Grand Total	**14,538**

Source: The Energy Resources Conservation Board (ERCB) and AESO.

Transmission and Distribution

Once generated, electrical energy moves from generating plants over high-voltage transmission lines to transformers which reduce the voltage level making it suitable for local distribution to consumers. Electricity is distributed over low-voltage lines to homes or businesses[5].

This report concentrates on the need for additional transmission lines between the Edmonton and Calgary regions.

5 Some jurisdictions, like Alberta, have a retail market segment.

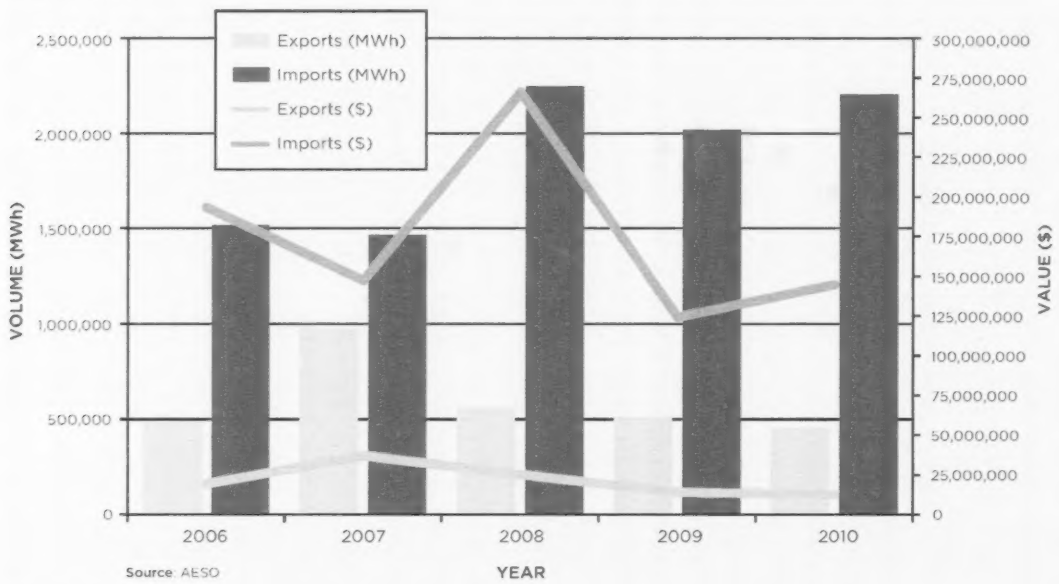
How Alberta's Electricity Market Works

Alberta's electrical power generation segment is competitive. This means that independent private sector investors make decisions to build plants, including fuel and technology choices, as well as the decisions regarding operations of individual plants. Electricity sold in Alberta is exchanged through a wholesale market where the price varies hour by hour. The wholesale price of electricity is determined by supply and demand. This price acts as a signal in several ways. For potential investors in the generation market, today's prices, and even more importantly forecasts of future prices, inform investment decisions. For operators of existing plants, prices influence when they produce and how they operate plants. For consumers, the wholesale price of electricity is part of the total delivered cost that consumers see in their energy bill. Some consumers pay an energy price that fluctuates with the wholesale market price while others choose fixed price contracts.

Importing and Exporting Electricity

In order to assist in effectively managing the supply of electricity, reduce costs and improve reliability, network connections, known as interties, have been established with British Columbia and Saskatchewan. The interties support opportunities to import electricity required to satisfy Alberta's demand and make the system more reliable. The interties also allow Alberta producers to export electrical energy to other markets.

Since 1996, Alberta has imported more electrical energy than it has exported in 15 of 16 years[6]. As the graph shows, between 2006 and 2010, the total import volumes were approximately three times as large as the total export volumes.



6 Alberta Energy

The Players

Alberta's electrical system is made up of the following entities:

Consumers are all Albertans: we use electricity in our homes, or to operate farms or to run businesses and industrial enterprises.

Public Sector

- **Alberta Government** through **Alberta Energy** develops legislation, regulations and policies to ensure Albertans have safe and reliable electricity at a competitive price.
- **Alberta Utilities Commission (AUC)** implements the legislation, regulations and policies for the utility, natural gas and electricity sectors.
- **Alberta Electricity System Operator (AESO)** an independent, not-for-profit organization, operates the wholesale energy market. It is also responsible for the forecasting and long term (20 years) planning of the transmission grid.

Private Sector

- **Generators (power plants)** produce power using steam, water flows or wind to turn a generator which creates electricity. Producers use a variety of fuel sources to create the steam (coal, natural gas, biofuel, etc.).
- **Transmission Facility Owners (TFO)** own and operate high voltage power lines and equipment within specific service areas that link generators to large customer loads and distribution systems.
- **Distribution Facility Owners (DFO)** own and operator low voltage power lines and equipment to link the high voltage power lines to homes, farms and businesses.

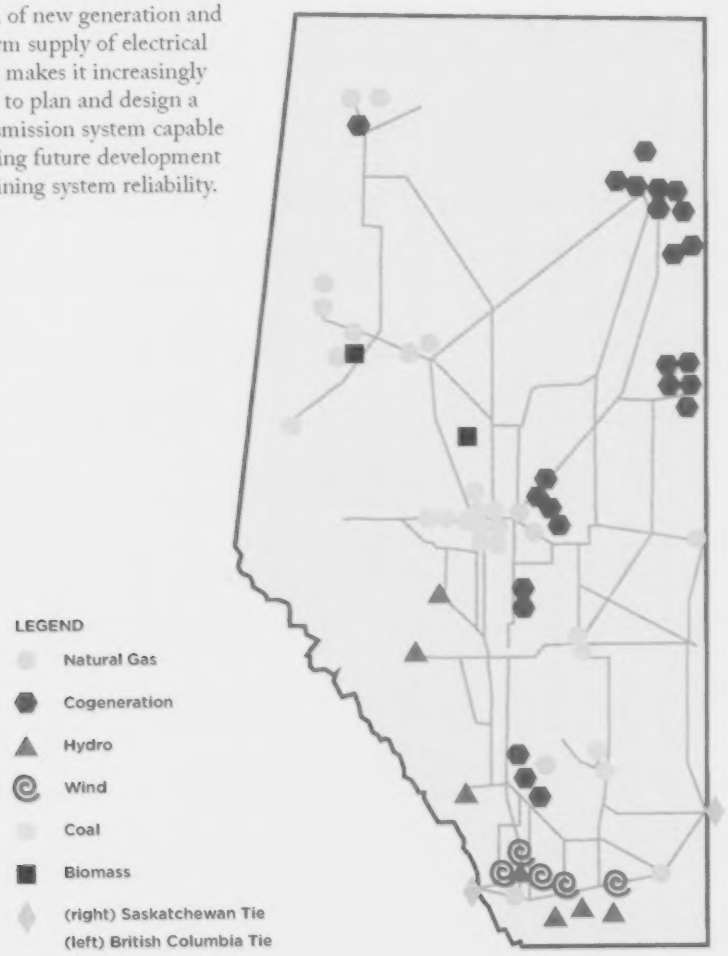
"Until transmission is improved, potential renewable or low emission electricity generation in Alberta will remain location-constrained. There are hydroelectric resources in the northern area of the province, wind and solar in the south, and biomass in the northwest. Optimal use of power from these sources depends on our ability to bring it to where it is needed."

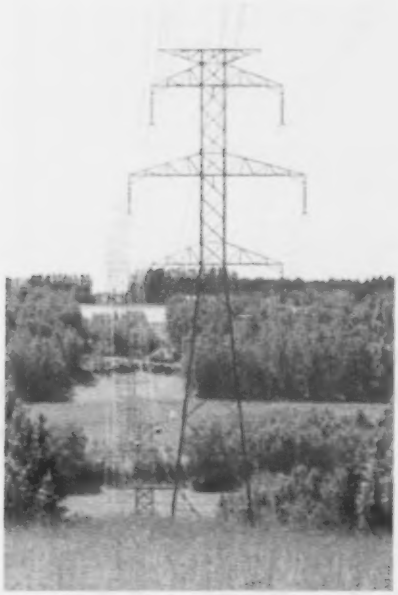
Provincial Energy Strategy

Loads and Supply Centres

Alberta's electrical energy is often produced far from where it is actually used. Presently much of Alberta's electrical energy is generated in the Edmonton area, while a large portion of it is consumed in the southern part of the province.

That said, the changing profile of Alberta's generation sources is testing the grid in new ways and creating pressures never experienced before. The expanding role of wind generators – mostly located in the South - (and other renewable energy sources) along with low natural gas prices, the scheduled retirement of coal fueled generators and the increased use of co-generation facilities makes it more difficult to forecast the investment in, and the location of new generation and the long-term supply of electrical energy. This makes it increasingly challenging to plan and design a robust transmission system capable of anticipating future development and maintaining system reliability.





How Electrical Transmission Systems are Approved

The AUC regulates the development of infrastructure (referred to as "facilities") in the electricity sector in two phases. The first phase identifies the need for new facilities. The second phase identifies the siting and land requirements for the designated facilities. The following table shows the process required to add new transmission lines in Alberta.

Defining the Need for Transmission

Phase 1	**Determines the Need**
Step 1	AESO forecasts on a regular basis the future supply and demand of generated electricity and the reliability of the transmission grid.
Step 2	AESO determines what additions or upgrades to transmission infrastructure are required to meet Alberta's supply and demand for electrical energy while meeting reliability standards. AESO consults with communities which may be affected by the new transmission line.
Step 3	AESO submits a needs application to the AUC explaining needed transmission upgrades.[7]
Step 4	AUC holds a public hearing on the needs application.
Step 5	AUC may (or may not) approve the need.
Phase 2	**Determines the Route in the case of an approved need**
Step 1	AESO assigns the project to a transmission facility owner (TFO).[8]
Step 2	The TFO consults with landowners on a specific route.
Step 3	The TFO proposes a specific route and makes a facilities application to the AUC.
Step 4	The AUC holds public hearings on the proposed route. At this point landowners may intervene.
Step 5	AUC may (or may not) approve the route.
Step 6	Landowner agreements are completed.
Step 7	Construction begins.

7 Under the *Electric Statutes Amendment Act, 2009* the Alberta Government approved four critical transmission infrastructure projects.

8 Whether the AUC or the Alberta Government determines the need in phase 1, the AUC has responsibility to determine the route (Phase 2).

DEVELOPMENT OF THE NORTH-SOUTH TRANSMISSION SYSTEM

The reinforcement of the north - south transmission system has been an issue of interest since the early 2000's.

2004 - 2007	The development of 500 kV transmission lines between the Calgary and Edmonton regions followed established regulatory procedures, including the approval of a Phase 1 needs application through the Electrical Utilities Board (EUB).
2007	During Phase 2 of the approval process, landowners raised concerns that the process showed bias toward the transmission operators. The Court granted the landowner group Leave to Appeal. The Phase 1 needs decision and the subsequent 500 kV Edmonton to Calgary line proposal application was ruled void due to irregularities in the hearing proceeding.
2008	The Alberta Utilities Commission (AUC) replaced the EUB and took on the role of regulating the utilities' sectors, including electricity transmission.
2009	The *Electric Utilities Amendment Act* was passed, enabling the Alberta Government to approve the development of critical transmission infrastructure. The Minister of Energy assigned the rights to AltaLink and ATCO, to apply to build high capacity high voltage direct current (HVDC) lines between Edmonton and Calgary in western and eastern Alberta, respectively.
2010	AltaLink and ATCO were given permission by the Minister to proceed with an AUC application under new legislation and regulations.
2011	At the request of the Minister, the AUC suspended consideration of those applications pending a government review. The Critical Transmission Review Committee was established to consult with stakeholders to determine if the transmission lines are required within a specific time frame.

Other Influences

The analysis over time of the need for reinforcement of Alberta's north-south transmission infrastructure has not taken place in a vacuum. Many important changes that impact the demand and supply of electricity have occurred.

Changes to the economy have affected the demand for electricity and thus the need for new transmission capacity. With the global recession in 2008, the pressure to build the new lines diminished slightly. The unexpected shut down of the Sundance generating units 1 and 2 in the Wabamun area also resulted in lower power transfer requirements on the existing north-south transmission lines in 2011. However, the need to prepare for expected growth in Alberta's robust economy including the oil sands region remains. Pressure continued to mount to develop the north-south lines due to other operational realities such as system stability concerns in the Wabamun area and voltage stability in the Calgary area.

Complicating matters further, the Federal Coal Strategy as currently outlined requires coal fired generation units to be retired after 45 years of service. This means that plant owners will not likely maintain or do life extension upgrades to their facilities nearing the end of their service life. Likewise natural gas generated electricity looks favourable as gas prices remain historically low and coal generating stations age. That said, natural gas prices have fluctuated significantly in the course of the last fifteen years, and longer-term future fluctuations are difficult to predict.

Notwithstanding the evolving pressure on transmission lines, approximately $400 million has been spent to maintain transmission system reliability following the 2007 decision to delay the north-south transmission reinforcement project[9]. This illustrates the continuing pressure for increased investment in transmission capacity.

9 AESO - January 24, 2012

ALBERTA GOVERNMENT'S POLICY SUITE

Through legislation, the Alberta Government creates the framework for Alberta's electricity industry. The principle pieces of legislation are the *Alberta Utilities Commission (AUC) Act* and the Electric Utilities Act. The framework is supported by the *Gas Utilities Act*, *Hydro and Electric Energy Act*, the *Transmission Regulation* and accounts for new power sources through the *Small Power Research and Development Act* where renewable sources of energy like wind, solar, biomass and peat resources are governed.

Under the *Electric Statutes Amendment Act, 2009* (formerly Bill 50), the Alberta Government took responsibility for approving the need for critical transmission infrastructure.

Key Elements of Safe, Reliable Electricity

Alberta's policy suite, through regulation and policy, imposes a certain number of constraints on transmission planning and operation.

Reliability Standards

The AESO is required by the Transmission Regulation to plan a transmission system that satisfies reliability standards, and to ensure that the transmission facilities comply with these standards. Alberta adheres to the reliability standards established by the Western Electricity Coordinating Council and the North American Electric Reliability Corporation[10].

The operating capability of the electric transmission system must be maintained under a variety of system conditions such as load levels, generation schedules and transmission line outages due to failures or maintenance activities.

The proposed system is exhaustively examined to determine its ability to respond to designated initiating events and contingency levels without violating required constraints.

The system operating limits include line thermal capabilities, system voltage stability and voltage collapse conditions, unacceptable voltage levels, and dynamic and transient stability constraints.

Geographic Separation

A reliable electrical system also depends on thoughtful, careful planning of where new transmission lines are to be located throughout the province. When considering the location of new transmission facilities, enhancements or upgrades, the AESO is required to maximize the efficient use of right of ways, corridors or other routes that already exist.[11]

10 Section 19.1 of the Transmission Regulation

11 Section 15.1 (1) of the *Alberta Electric Utilities Act* Transmission Regulation

The reliability of a transmission grid is also enhanced by geographically separating transmission corridors so that adverse weather or natural disasters do not affect the whole grid.

Uncongested Networks

A robust and unconstrained transmission system is one that provides equal access so all consumers and generators can connect to the grid.

The electrical system is said to be congested when the transmission facilities are overloaded or do not meet the Alberta Reliability Standards. When the transmission system is congested, out-of-merit generation is required to maintain supply to consumers resulting in higher energy costs for Albertans.

The AESO is required to plan a transmission system that is sufficiently robust so that 100 percent of the time transmission of all anticipated in–merit electrical energy can occur when all transmission facilities are in service.

On an annual basis, the transmission system must be adequate so that at least 95 percent of the time transmission of all anticipated in–merit electrical energy can occur when operating under abnormal conditions. [12]

An unconstrained grid provides certainty to those who invest in new generation and gives those in other industries the confidence to do business in the province, secure in the knowledge that electricity will be available when they need it.

Timing

The electrical transmission system in Alberta is to be built ahead of need. The AESO forecasts future demand for electricity and establishes generation capacity requirements including appropriate reserves to meet the forecast load.

Transmission facilities must be available in a timely manner to ensure that in-merit generators can be dispatched to meet the electricity needs of Albertans.[13] When forecasting future load growth, the AESO works with the generation industry (market participants) to ascertain the timing of additional electrical energy supplies including renewable or low emission generation. It then creates the transmission development plan to accommodate the transmission needs of the new generators.

12 Section 15(1) (e)(ii) of *Alberta Electric Utilities Act* Transmission Regulation

13 Part 2, Section 8 of the *Alberta Electric Utilities Act* Transmission Regulation

AESO CURRENT FORECAST AND NEEDS ASSESSMENT

Under the Transmission Regulation of the *Electrical Utilities Act*, the AESO is responsible for developing the province's long term transmission plan along with a number of forecasts related to electricity transmission planning in Alberta. This plan is publicly available and is based on real-time data. This information provides statistical and background knowledge into the general demand forecast, the generation forecast and overall system performance.[14]

Long-Term Outlook

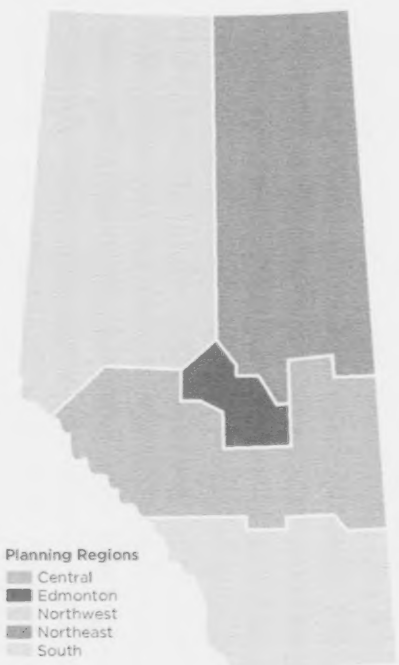
Alberta's electricity load is forecast to grow an average by 2.5 percent annually over the next 20 years. A significant driver of this growth is the $180 billion of oilsands projects on the horizon over the next 10 years. This proposed investment impacts electricity demand directly, but also indirectly through its impact on other economic sectors and population growth.

The AESO's 2012 load growth and generation forecasts remain consistent with their 2011 Long Term Plan.

Load Growth By Region

Alberta's main economic drivers are expected to shift from conventional oil, gas and forestry to oilsands expansion. The map at right illustrates the projected demand for electricity by region over the next 8 years.

With the return of new industrial developments in the chemical, forestry products and natural gas sector, more electricity will be required. The regional forecast takes into consideration the extensive number of connection requests in the next 5 to 8 years.[15]



Northwest	
2010 Load	1,039 MW
2020 Load	1.132 MW
*CAGR %	0.9%

Northeast	
2010 Load	2,368 MW
2020 Load	4,274 MW
*CAGR %	6.1%

Edmonton	
2010 Load	2,093 MW
2020 Load	2,652 MW
*CAGR %	2.4%

Central	
2010 Load	1,505 MW
2020 Load	1,925 MW
*CAGR %	2.5%

South	
2010 Load	2,917 MW
2020 Load	3,771 MW
*CAGR %	2.6%

Source: AESO

*CAGR = Compound Annual Growth Rate

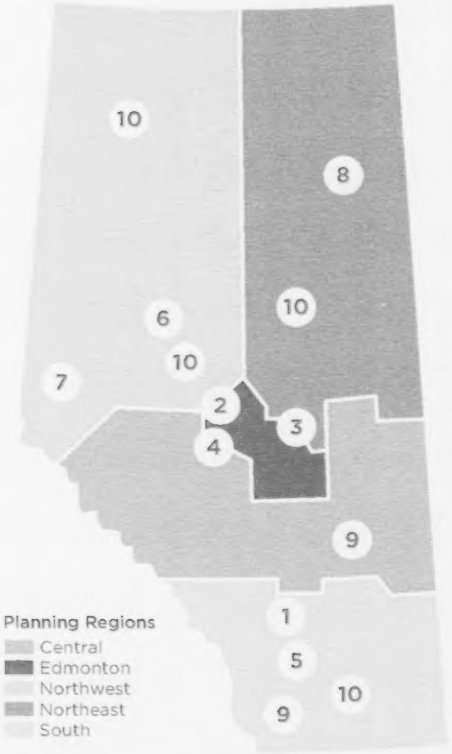
14 AESO Draft 2011 Long Term Transmission Plan

15 AESO January 24 briefing

Generation Forecast

An estimated 11,200 MW of new generation capacity will be required to keep up with the anticipated load growth and off-set the impact of retiring coal generation sources.

Currently, the existing coal-fired generators are subjected to the Federal Coal Strategy and proposed greenhouse gas emission (GHG) legislation, which will force the retirement of these facilities after 45 years of service. This means large scale gas-fired generation remains attractive to investors, including the new 800 MW Shepard generation plant currently under construction near Calgary. Several more gas-fired facilities producing about 2,250 MW have also been announced for northern brownfield sites.



	Technology		Status	ISD
Combined Cycle	**Total 3,400 MW**			
1	Shepard - Calgary	800 MW	Under Construction	May-2015
2	Sundance 7 - Wabamun	850 MW	AESO Application in process	April-2015
3	Sundance 8 - Wabamun	700 MW	Corporate Announcement	2018/19
4	Sundance 9 - Heartland	700 MW	Corporate Announcement	2012/22
5	Saddlebrook - High River	350 MW	AUC Approval	February-2015
Coal	**Total 790 MW**			
6	Swanhills Synfuels	340 MW	Government Funded	July-2014
7	HR Milner - Hinton	450 MW	AUC Approval	July 2015
Cogeneration				
8	OSDG - Ft. McMurray	2,400 MW	Various	
Wind				
9	Aggregate	5,500 MW	Various	
Other (biomass, waste heat, hydro)				
10	Aggregate	95 MW	Various	

WHAT WE HEARD

There has been much interest from businesses, industry stakeholders and residents in the issue of reinforcing the north-south electrical transmission infrastructure over the past decade. Perspectives and opinions on the matter can be grouped into three distinct views. One view opposes any reinforcement at this time. The second point of view believes that the province has adequate time to return to the AUC original process of needs assessment. The third view is that reinforcement is past due and is required as soon as possible.

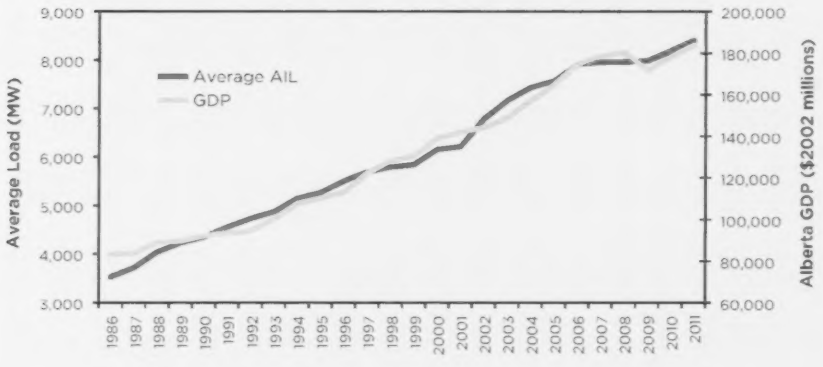
What most people agreed on is that Alberta is likely to have a very robust economy for the foreseeable future. As a result, the province's population and GDP are expected to continue to grow, as national and international investors continue to invest in Alberta's resources.

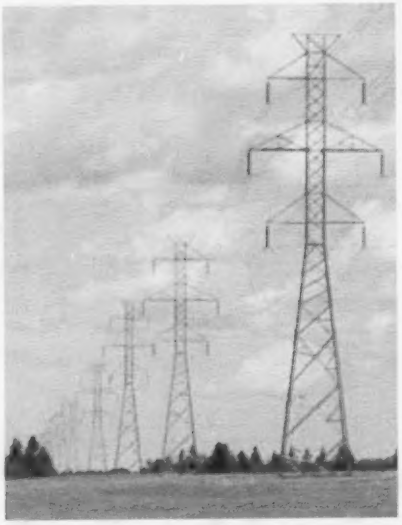
Alberta's electricity market is a $7.2 billion industry

Fundamentally throughout the consultation, it was clear that Albertans want the provincial government to base the decision related to north-south electrical transmission on the long term strategic needs of all Albertans.

Please see www.ctrc-ab.ca for more details.

Average Alberta Internal Load (AIL) and Alberta Real GDP





North-South Transmission Reinforcement is Not Required

Groups and individuals opposed to the transmission lines cite the following arguments for why the reinforcement is not required:

- The South of KEG (Keephills, Ellerslie, Genesse) electricity flows do not warrant upgrades
- The costs are too high for industrial consumers to bear
- There would be unnecessary intrusion into farmland for lines that are not needed
- The lines are only intended/required for export and exporters get free use of the lines, therefore Albertans subsidize large corporations
- Building generation in the south negates the need for north-south reinforcement
- Gas turbines can be located anywhere, but in particular, should be located in the south near where the load is
- The provincial policy requiring uncongested transmission lines is unrealistic and should be amended to allow non-wires solutions (i.e. use of higher-priced local generation)
- Greenfield sites are relatively easy to develop and obtain approvals for
- The case for reducing line losses is not valid, as line losses are normal
- The record high system peak in January 2012, proves the system has adequate capacity
- Central Alberta cannot be serviced by these upgrades
- Load growth forecast is too aggressive and does not reflect the recent trend
- The use of HVDC technology is unnecessary and costly

Back to the Drawing Board

The second group of opinions the committee heard were from those people who are uncertain of any needed reinforcement. This group was prepared to return the matter to the AUC to conduct a regular (or some suggested an expedited) needs assessment. This group believes:

- There is no sense of urgency for north-south transmission reinforcements
- Industrial and residential customers have no ability to manage transmission charges - they can only hedge or contract the energy portion
- The impact on residential rates will be too onerous
- Bill 50 has removed all accountability from the approval process. We need to start over

- There is capacity to accommodate growth for a while due to a reduction in flows on the north-south lines as a result of the shutdown of the Sundance generating units 1 and 2 and the start-up of the Shepard Energy Centre
- The use of HVDC technology needs to be examined in a regulatory hearing

North-South Lines Needed as Soon as Possible

The third perspective that came through the consultation was that electrical transmission system reinforcement is required:

- Alberta's economy is poised to take off, including forecasts more than $180 billion in capital investment in oilsands projects over the next 10 years
- Alberta will experience continued population increases
- Investors both on the generation and load side need confidence that they will be able to access the grid on a timely basis
- Be prepared - plan now for the future
- Public infrastructure by definition should be available ahead of the need
- New project developers are expressing concern about Alberta's ability to provide timely connections to the grid, and the reliable supply of electrical power without significant restrictions attached
- By building the Eastern Alberta Transmission Line (EATL), we open a second north-south backbone and provide geographic separation required in the provincial regulations
- The costs of congestion far outweigh the costs of reinforcements
- We have been discussing these reinforcements for 12 years, it is time to make a decision
- We have spent $400 million on remedial reinforcements because of the delays in getting approval for the north-south upgrades
- Reliability and grid stability risks are currently very high
- Scheduling maintenance of the existing lines is becoming increasingly difficult
- The cost of having electrical transmission capacity available two years too early far outweighs the risk and costs of having adequate transmission capacity available two years late
- Maintenance is often postponed due to economic circumstances
- Our aging system needs attention
- The use of HVDC is the right choice for Alberta to build future capacity and minimize impacts on landowners

"Transmission infrastructure is a public good that must be available in advance of need, enable the addition of new generation and be capable of meeting long-term growth throughout the province"

Other Considerations:

Rate of Growth

Alberta's population has increased from 1 million (in 1951 census) to 3.8 million (2011 census). Alberta's population has quadrupled in 60 years.

Economic

Alberta's reputation could be severely damaged if appropriate public infrastructure is not in place ahead of need.

Consumers have paid significant remedial costs due to congestion and line losses, which could have perhaps been used to pay for one of these lines over the past three years.

Legislation, Policy and Regulations

Electric Statutes Amendment Act, 2009 (formerly Bill 50)

At the height of the last economic boom, the Alberta Government faced a unique set of circumstances and needed to have critical transmission infrastructure built to support the demands of the economy. This led to the introduction of the *Electric Statutes Amendment Act, 2009* to move the projects forward in a timely manner.

Since that time, the economy and demands on the system have changed.

Some participants understood the Government's actions in the face of that demand and support the *Electric Statutes Amendment Act, 2009* as a measure of last resort to expedite the development of critical transmission infrastructure when the integrity of the transmission system is at risk.

The majority of the participants recognize the AUC as a trusted authority to make decisions related to the need and routing of future critical transmission infrastructure. They also indicated that the process needs to be streamlined to be as efficient and effective as possible.

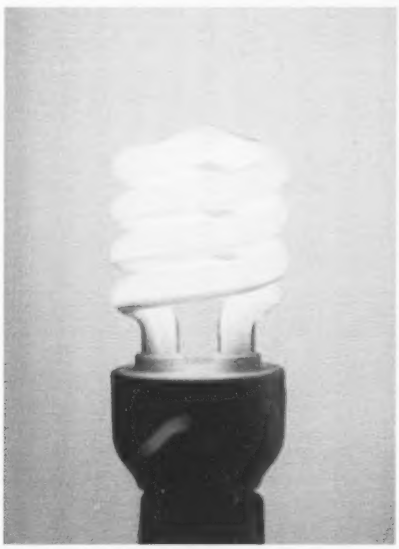
ANALYSIS

The question of the need for north-south transmission reinforcement has been examined extensively over the last decade and a formal Need Identification Document (NID) was filed in 2004. This NID presented detailed analyses of 13 different options, each of which was examined in accordance with the criteria listed in the Transmission Regulation at that time. Two concepts, designated as Concept V and Concept XI, namely a single circuit 500 kV high-voltage alternating current (HVAC) line and a double circuit 500 kV HVAC line respectively were recommended. The single circuit 500 kV HVAC line was accepted by the EUB in 2005, but the decision was declared void in 2007 as a result of procedural abnormalities.

The 2005 Long Term Plan identified a need for two 500 kV HVAC lines rated at 1000 MW each, with in-service dates of 2009 and beyond 2015. A similar reinforcement was identified in the 2007 Long Term Plan. The 2009 Long Term Plan identified a need for two 500 kV HVDC lines rated at 2000 MW each with 2013 in-service dates. Consistent with the *Electric Utilities Act*, this requirement was modified in the draft 2011 Long Term Plan by assigning each HVDC line a 1000 MW rating, with an in-service date of 2014, and expandable to 2000 MW at a future date.

It is important to note that the designated transmission technology changed from HVAC to HVDC in the 2009 Long Term Plan. This was largely due to changes in policy and legislation that directed the use of HVDC as a preferred option. The 2009 Provincial Energy Strategy states that when strengthening the provincial transmission system "Improvements will be sized to accommodate long-term growth and will use, where possible, technology such as high-voltage direct current to maximize efficiency of rights-of-way and minimize impacts." HVDC transmission uses smaller tower structures and requires less right-of-way than a comparable capacity HVAC line, and less interruption of existing land use. HVDC allows transmission capacity to be scaled up by adding converters at line terminations without having to expand the right of way to add more transmission lines. HVDC also includes power flow control to manage contingencies and maximize path efficiencies. Therefore, the recommended technology in the draft 2011 Long Term Plan is 500 kV HVDC.

The AESO 2012 long term forecast indicates that economic growth in Alberta is expected to remain strong and that demand for electrical power and energy will continue to increase. The key factors regarding load and generation growth embedded in the 2011 Long Term Plan are present in the 2012 forecast. The 2012 forecast recognizes that the oilsands will remain the major driver of load growth and co-generation, and that there is likely to be a shift from coal-fired generation to gas-fired generation as a result of changes in federal environmental policy and long term low gas prices.



The AESO has the responsibility for planning a transmission system that is sufficiently flexible to satisfy a wide range of possible future load and generation outcomes. The Provincial Energy Strategy states that "Transmission infrastructure is a public good that must be available in advance of need, enable the addition of new generation and be capable of meeting long-term growth throughout the province."

The AESO utilized a range of scenarios in its 2012 load and generation forecasts, including environmental considerations such as the Federal coal legislation and emission policies, high and low oilsands load requirements, co-generation, combined cycle developments, and renewable energy sources such as wind.

The need analysis conducted by the AESO showed the anticipated planning flows associated with the considered scenarios exceed the existing limits on the South of Keephills (SOK) cut plane[16] and that immediate reinforcement of the North-South transmission system is required. The limits on the capacity of the existing system are determined by congestion and reliability analysis utilizing the initiating events and contingency requirements in the Alberta Reliability Standards[17].

The basic conclusion from the AESO 2012 forecasts and studies is that two HVDC lines will be required over the planning horizon, that the first of these two lines is needed as soon as possible and the second line is potentially needed as early as 2018.

The SOK transfer limits are impacted by the performance of the six 240 kV HVAC lines that now constitute the north-south transmission backbone of the system. Some of these lines are approaching the end of their service lives and will need to be refurbished or retired in the near future. If this becomes necessary, it may be advisable to advance the in-service date for the second 500 kV HVDC transmission line.

The proposed reinforcement of the north-south transmission will also allow intermediate substations to be tapped off the existing 240kV lines to service local load growth.

Day to day operational requirements also support AESO's planning view that immediate reinforcement of the north-south transmission system is required. Up to $400 million was spent on remedial solutions when the north-south reinforcement plan was delayed in 2007. A remedial action scheme (RAS) was installed at the Keephills generating station to maintain stability of the system under the loss of two or more transmission system elements. Another RAS in the same area addresses overload on the Ellerslie 500/240 kV transformer under an outage of the other transformer.

16 A cut plane is an imaginary line separating two areas of the transmission system to enable the evaluation of flow of electrical energy on multiple lines connecting these two areas.

17 Section 19.1 of the *Electrical Utilites Act* Transmission Regulation

THE RECOMMENDATIONS

In the committee's considered opinion, the following recommendations are being put forward to address concerns related to development of the north-south transmission reinforcement between the Calgary and Edmonton regions.

The recommendations are based on the following findings:

Economic, Demand and Generation Forecast

1. **The committee finds that AESO's economic, load and generation forecasts for Alberta are reasonable.**

The data, methodology and intellectual rigour used to determine future demand for electrical transmission in Alberta is credible and robust. The AESO has access to exclusive statistics from real time data points across the provincial grid to analyze the transmission system as well as appropriate information on load and generation development. We believe that the AESO's team has greater specialized knowledge for the Alberta electric demand than any other single organization and also consults widely with stakeholders and external forecasting experts to vet its approach and results.

Specifically, AESO's load forecast is based on global, regional and local considerations and is closely correlated to Alberta's GDP which is a recognized global measure for the predictable use of electricity.

The generation forecast recognizes the uncertainties in the individual corporate development investment plans. As generation is investor driven the AESO estimates the future installed generation capacity based on each business case. The AESO has access to this confidential investment information to predict future generation and develop transmission plans based on these scenarios.

The AESO also accounts for other factors such as location and industry shifts. For example, many new gas fired generators are likely to be located on brownfield sites due to a wide range of factors including existing infrastructure, permitting and license agreements.

The AESO takes into account the real-time statistics of co-generated electrical energy and power that is produced 'behind the fence'. Many industries producing this type of electrical energy do not have the capacity to serve their entire load and prefer to be able to access the grid.

The AESO also monitors and measures the flow of electrical energy in and out of Alberta. Alberta has one of the fastest growing economies in North America and historically imports more electrical energy than it exports. The province is at a competitive disadvantage in the economics of exporting electricity. Exporting where thermal energy competes against hydro and US gas fired generated energy simply is not economically viable.

Need for Transmission Reinforcement

2. **The committee agrees that the AESO's recommendation to proceed with the development of two 500 kV transmission lines is reasonable.**

   The need analysis conducted by the AESO indicated that the anticipated planning flows associated with the considered scenarios exceed the existing limits on the South of Keephills (SOK) cut plane. As a result, immediate reinforcement of the north-south transmission system is required due to the increasing difficulties in complying with industry standards and AESO operating rules and procedures.

   The committee notes that the need for the transmission reinforcement was established in 2004 and approved as part of the regulatory process in place. Since that time, growth in the province has increased and so has the demand for electricity. In addition, the likelihood of brownfield, greenfield and co-generation developments in northern Alberta increases the need for additional north-south transmission capacity. This approach also supports Alberta's fair, efficient and openly competitive electricity market.

HVDC Technology

3. **The committee has determined that the AESO's decision to use HVDC technology is reasonable.**

   The use of HVDC transmission reinforcement is more respectful of landowners. The HVDC transmission towers have a smaller footprint making it less inconvenient for landowners. The technology can also be scaled up to provide greater transfer capacity without requiring future access to the right of way.

   There are additional technical benefits to the use of HVDC. This includes operating flexibility and the ability to control the flow of electrical energy on the north-south interconnection. The Alberta Government, recognizing these benefits, directed the use of HVDC where possible.

Timing and Sequencing

4. **The committee finds it reasonable for the Alberta Government to proceed with the development of the two 500 kV HVDC transmission lines as soon as possible.**

   The committee agrees with proceeding with both lines due to the significant risk of regulatory and construction delays of the transmission reinforcements.

   With large scale projects of this magnitude, moving forward with both projects concurrently is a sound approach given the increasing pressure on the transmission system. By proceeding concurrently with the Western Alberta Transmission Line (WATL) and EATL, the need for a reliable electrical

transmission system between Calgary and Edmonton is more likely to be satisfied on time and provides capacity in advance of the need for a second line.

The committee understands that the addition of either WATL or EATL alleviates the immediate operating concerns and meets the requirements to support the transmission needs of the Calgary region in the short-to medium term.

Electric Statutes Amendment Act, 2009

5. **The committee recommends the government amend the legislation** authorizing it to designate future proposed transmission facilities as critical transmission infrastructure. The need for future critical transmission infrastructure would then be considered under the authority of the Alberta Utilities Commission.

Rate Impacts

6. **The committee understands that there will be rate increases associated with the development of north-south transmission system reinforcement and recommends the AUC consider options that will mitigate the impact to consumers.**

   The anticipated cost to the residential consumer is $3/month based on the estimate that consumers absorb these costs at a rate of $1/month per billion dollars of transmission infrastructure investment.

   It is important to note that only 25 percent of Albertans have chosen fixed price contracts. The remaining 75 percent of Alberta's residential customers remain on the regulated rate option which exposes them to the volatility of the market.

   The estimated cost to an industrial consumer is anticipated to be $1.25/ MWh. The committee acknowledges the concerns of the industrial customers. Additional work in this regard is underway through the Transmission Facilities Cost Monitoring Committee.

Competitive Bidding

7. **The committee encourages the use of the competitive procurement process for future critical transmission infrastructure projects** and the continued use for procurement of components.

REFERENCES

AESO Draft Long Term Transmission Plan 2011
http://www.aeso.ca/transmission/22021.html

Alberta Smart Grid Report
www.energy.alberta.ca/Electricity/pdfs/SmartGrid.pdf

Critical Transmission Review Committee website
www.ctrc-ab.ca/53.asp

Powering Albertans website
www.poweringalberta.com

Provincial Energy Strategy
www.energy.gov.ab.ca/Org/pdfs/AB_ProvincialEnergyStrategy.pdf

APPENDIX A

Ministerial Order

Government of Alberta
Energy

Office of the Minister

404 Legislature Building
Edmonton, Alberta
Canada T5K 2B6

Telephone 780/427-3740
Fax 780/422-0195

GOVERNMENT OF ALBERTA

DEPARTMENT OF ENERGY

MINISTERIAL ORDER 120/2011

I, TED MORTON, Minister of Energy, pursuant to section 7 of the *Government Organization Act* RSA 2000 cG-10 make the Order in the attached Appendix, being the Critical Transmission Review Committee Order.

Dated the 6 day of December, 2011

- original signed by Ted Morton
Minister of Energy

APPENDIX

CRITICAL TRANSMISSION REVIEW COMMITTEE ORDER

Whereas:

1. Bill 50 (the *Electric Statutes Amendment Act, 2009*) was introduced on June 1, 2009, and was amended on November 24, 2009. One of the purposes of Bill 50 was to establish a new approval process for transmission projects deemed to be critical transmission infrastructure. To this end, Bill 50 proposed a number of amendments to the *Electric Utilities Act*, the *Hydro and Electric Energy Act* and the *Alberta Utilities Commission Act*. The *Electric Statutes Amendment Act, 2009* came into force on December 9, 2009.

2. In its first decision dealing with critical transmission infrastructure (Heartland Transmission Project[1]) following the coming into force of the *Electric Statutes Amendment Act, 2009*, the Alberta Utilities Commission ("AUC") found that:

> "... the only material difference between the regulatory process for critical transmission infrastructure and the process for all other new transmission projects in Alberta is that the responsibility for approving the need for critical transmission infrastructure has been transferred from the Commission to the Alberta government.[2]
>
> The new approval process for critical transmission infrastructure established by the *Electric Statutes Amendment Act {sic}* has not ... created a single streamlined process for the approval of critical transmission infrastructure. To the contrary, the regulatory process for all new transmission projects continues to be a two stage process, with each stage requiring a separate public interest determination.[3]
>
> In the first stage of the approval process, a decision is made as to whether a new facility is required to meet the needs of Albertans and is in the public interest. For critical transmission infrastructure projects, this public interest determination is made by the legislature or the Lieutenant Governor-in-Council. For all other projects, this determination is made by the Commission under Section 34 of the *Electric Utilities Act*. The public interest determination at this stage is whether there is a demonstrated need for the project and whether the technical solution to meet that need is acceptable, having regard to its technical attributes and functional capability, its expected cost, and a high level examination of its potential land use impacts.[4]
>
> In the second stage of the approval process, which applies to all new transmission projects, the Commission decides whether the approval of a specific transmission project that was designed to meet the need identified in the first stage, is consistent with the technical solution identified in the first stage, and, is in the public interest having regard to its social, economic and environmental effects. At this stage the

[1] AUC Decision 2011-436, November 1, 2011
[2] At paragraph 140
[3] At paragraph 141
[4] At paragraph 142

public interest standard will generally be met by a route alternative that benefits the segment of the public to which the legislation is aimed, while at the same time minimizing, or mitigating to an acceptable degree, the potential adverse impacts on more discrete parts of the community.[5]

...

The government of Alberta's approval of need for a new transmission project, which is manifested by designating a project as critical transmission infrastructure, must be considered an approval of the need to expand or enhance the system, and an approval of the preferred technical solution to address the need. The Commission concludes that the effect of Section 13.1 *{of the Hydro and Electric Energy Act}* is that the need for a critical transmission infrastructure project, the technical solution to address that need and the inherent impacts of the technical solution are all considered to be in the public interest.[6]

...

The Commission concludes that the legislature, having assumed jurisdiction over the approval of the need for critical transmission infrastructure, is now responsible for determining the need for critical transmission infrastructure including all of its constituent elements. The effect of this change is that, when deciding upon a facility application for critical transmission infrastructure, the Commission must not address the matters which the legislature has already addressed when designating a project to be critical transmission infrastructure. To reconsider the need for a project or the suitability of the technical solution would be contrary to the legislative intent, and would result in a regulatory process that does not minimize costs and is inefficient and would be inconsistent with the stated purposes of the *Electric Utilities Act*."[7]

3. The Government of Alberta, having the authority to make decisions in the first stage of the approval process for critical transmission infrastructure, also has authority to review, or cause to be reviewed, the information related to the Government's decision regarding that approval.

4. Accordingly, the Government of Alberta wishes to establish a committee to review only the information considered to be directly relevant to the Government's decision in the first stage of the approval process approving the North-South Critical Transmission Infrastructure, and based on that review to provide the committee's recommendations to the Government.

Review Committee Established:

5. The Critical Transmission Review Committee (the "Committee") is hereby established to perform the duties and functions described in this order.

6. The Committee shall consist of the individuals identified in the attached Schedule.

---

[5] At paragraph 143
[6] At paragraph 152
[7] At paragraph 160

7. The Committee may make rules governing the calling of and conduct of meetings and any other matters pertaining to its business and affairs.

8. Subject to any further Order otherwise each Committee member will hold office for a term expiring on March 31, 2012.

9. For their service on the Committee, the Chair and members of the Committee are entitled to remuneration and to reimbursement for their travelling and living expenses, in accordance with the rates set out in Appendix A, Scale of Costs, of the AUC's Rule 22.

Terms of Reference:

10. The Committee shall conduct itself in accordance with the following terms of reference:

(1) Review the process and information used by the Alberta Electric System Operator ("AESO") in considering and developing the north-south transmission reinforcement plan, that was ultimately enacted by the *Electric Statutes Amendment Act, 2009* as section 1 of the Schedule to the *Electric Utilities Act*.

(2) Conduct the review with due regard for the following:

(a) Alberta legislation regarding electricity,

(b) the articulated policies of the Government of Alberta, including the Provincial Energy Strategy,

(c) the reliability of the Alberta Interconnected Electric System ("AIES"),

(d) the ability of the AIES to serve existing and new generators and load,

(e) landowner feedback provided to the AESO or in the public record as part of the proceedings before the AUC for approval of the Eastern and Western Alberta Transmission Lines, and

(f) the complete "All-in" cost of electricity (comprised of transmission, distribution and energy costs) and its impact on Alberta electricity consumers, and the competitiveness of Alberta industries,

(g) current regulatory and market dynamics, including pending federal regulations for reducing greenhouse gas emissions from the power sector, and the changing nature of natural gas markets in North America.

(3) Using a public process, obtain and consider input provided by the following:

(a) the Alberta Association of Municipal Districts and Counties,

(b) the Alberta Direct Connect Consumers Association,

(c) the AESO,

(d) the Alberta Federation of Rural Electrification Associations,

(e) the Alberta Urban Municipalities Association,

(f) the Balancing Pool,

(g) the Canadian Wind Energy Association,

(h) the Consumer's Coalition of Alberta,

(i) the Canadian Federation of Independent Business,

(j) electric utilities in the Province of Alberta,

(k) the Independent Power Producers Society of Alberta,

(l) the Industrial Power Consumers Association of Alberta,

(m) the Market Surveillance Administrator,

(n) the Office of the Utilities Consumer Advocate,

(o) the Oil Sands Developers Group,

(p) the applicants for approval of the Eastern and Western Alberta Transmission Lines (ATCO Electric Ltd. and AltaLink Management Ltd., respectively),

(q) such other groups, agencies, industry participants, or businesses that the Committee considers appropriate, and

(r) other organizations making application to the Committee that the committee considers appropriate.

(4) If in the opinion of the Committee, any information to be provided to the Committee is commercially sensitive or could reasonably be expected to adversely affect the rights of the organization providing such information, the Committee may obtain such information *in camera*.

(5) Obtain and consider expert input from the AESO on the current load and generation forecasts, the state of the AIES, the reliability standards, the AESO assessment of pending regulations for greenhouse gas emissions for the thermal power sector, and the changing nature of natural gas markets in North America, and other reinforcement planning.

(6) Comment and provide the Committee's opinion on the following issues:

(a) the AESO's system forecast,

(b) the selection of High Voltage Direct Current technology for the north-south transmission reinforcements, and

(c) the timing of the planned north-south reinforcements.

(7) For each issue in section 10(6), consider and recommend, with justification, whether:

(a) the AESO's assessment of the issue is reasonable, or

(b) the AESO's assessment of the issue is generally reasonable but requires modifications, or

(c) the AESO's assessment of the issue is not reasonable.

(8) Where, under section 10(7)(b) the Committee finds modifications to the AESO's assessment are necessary, the Committee shall make appropriate recommendations regarding the required modifications.

(9) The Committee shall consider and recommend appropriate changes to the *Electric Statutes Amendment Act, 2009*.

11. The Committee shall submit to the Minister of Energy a written report detailing the results of the review by February 10, 2012.

12. Any recommendations and advice that may be made by the Committee in the course of carrying out its duties and functions will not restrict or be binding on the Minister or the Government of Alberta.

Secretariat:

13. The Department shall provide secretariat services to, and in respect of, the Committee; including services related to the *Freedom of Information and Protection of Privacy Act* and records management. After the Committee has dissolved, the Energy Department shall provide for the long term preservation of the records relating to the Committee in accordance with the records management program of the Government of Alberta.

SCHEDULE OF MEMBERS

CRITICAL TRANSMISSION REVIEW COMMITTEE ORDER

CHAIR:

Mr. Brian Heidecker

MEMBERS:

Dr. Roy Billinton
Dr. Joseph Doucet
Mr. Henry Yip

APPENDIX B

CRITICAL TRANSMISSION REVIEW COMMITTEE

REQUEST FOR INFORMATION
CRITICAL TRANSMISSION REVIEW COMMITTEE

On December 6, 2011, the Government of Alberta announced the establishment of the Critical Transmission Review Committee (the Committee). The Committee is mandated to review the process and information used by the Alberta Electric System Operator (AESO) in considering and developing the north-south transmission reinforcement plan. The Government of Alberta news release is enclosed for your information.

As an initial step in this review, the Committee is contacting key stakeholders in order to give you an opportunity to provide information to the Committee. The information the Committee views as particularly relevant and within scope is information that directly relates to:

- The AESO's load and generation forecast, including the ability of the north-south transmission reinforcement to serve existing and new generators and load;
- The use of HVDC technology for the north-south transmission reinforcement;
- The timing of both north-south transmission lines; and
- Suggested amendments to the *Electric Statutes Amendment Act, 2009* (formerly Bill 50), specifically related to cabinet authority to approve critical transmission infrastructure and the north-south reinforcement projects.

The Committee has determined that certain items that were included in the *Electric Statutes Amendment Act, 2009* are outside of the scope of the review. Accordingly, the Committee may disregard stakeholder comments that relate to reliability standards, the Transmission Facilities Cost Monitoring Committee, and the Balancing Pool.

The information the Committee is seeking is described in more detail in the enclosed document. The Committee respectfully requests you to please direct your responses to the specific material and comments requested within each section of the document.

The Committee will only accept substantiated text written conclusions and summaries of analysis in stakeholder responses. Detailed analysis documents are not to be included within the body of stakeholder responses, but may be referenced in an appendix. The Committee may request appendices, but they should not be submitted. Stakeholder responses are to be no more than 20 single pages in length and must be formatted with 12 point Arial font. The Committee requests that the responses be submitted electronically in a searchable .pdf file format. Only one submission will be accepted from each organization. Further details regarding the submission process will be distributed in the near future. The Committee requires that all stakeholder responses be submitted no later than end of day Friday, January 06, 2012.

The Committee will be making all submissions publically available through its website. Organizations should refrain from including any personal information within its submission, outside that which would routinely be disclosed in a business or professional context (i.e. business contact information). The Committee will remove any personally identifying information, where it deems disclosure to be an unreasonable invasion of privacy, prior to making the submission publically available. The Committee also reserves the right to remove any language or content that it deems inappropriate for broad distribution, prior to posting the document.

Subsequent to the submissions being received, you and other stakeholders will have an opportunity to present your conclusions and observations to the Committee in a public forum. The time and location of this presentation will be determined in the coming weeks and an official request will be sent at that time.

The Committee must provide a report to the Minister of Energy by February 10, 2012. The report will include the Committee's comments and recommendations regarding the reasonableness of several key elements of the AESO's plan and amendments to the *Electric Statutes Amendment Act, 2009* (formerly Bill 50).

If you have any questions, please contact the Committee at ContactUs@CTRC-AB.ca.

Yours truly,

Brian Heidecker
Critical Transmission Review Committee

Enclosures

POWERING OUR ECONOMY

CRITICAL TRANSMISSION REVIEW COMMITTEE
REQUEST FOR INFORMATION –

CTRC- – 1

Preamble: In developing its Long-term Transmission System Plan, the Alberta Electric System Operator (AESO) does a detailed load and generation forecast. In 2009, the AESO concluded that a major generation build of 11,500 megawatts (MW), which is almost equal to Alberta's current electricity generation capacity, was needed in the next 20 years to meet forecast growth in electrical load and replace older generating units that are being retired. An updated AESO forecast, released in February 2010, confirmed the projections used in the AESO's 2009 plan, and forecasts peak demand and electricity consumption to grow by more than three per cent per year until 2029 - nearly doubling demand for electricity in Alberta over the next 20 years. Based on these forecasts, the AESO determined that Alberta's transmission system requires major upgrades, including the north-south transmission system.

Request:

(a) Provide substantiated comments and observations about the reasonableness of the AESO's load and generation forecast in its proposal for the north-south reinforcement.

(b) Please provide your comments and observations regarding the ability of the north-south transmission reinforcement plan to serve existing and new generators and load.

Response:

CTRC- 2

Preamble: The Alberta Electric System Operator (AESO) has selected high voltage direct current (HVDC) technology as the long-term solution for the transmission system in the north-south corridor. In the Provincial Energy Strategy, the Government of Alberta provides policy direction that improvements to the transmission system be sized to accommodate long-term growth, use technology that will maximize efficiency of rights of way and minimize impacts. During the AESO's public consultation for the 2009 Long-term Transmission System Plan, a commonly-held stakeholder view was that they prefer reinforcements with higher capacity to accommodate long-term growth that would also mitigate the need for repeatedly returning to build more transmission lines in the future.

Request:

(a) Provide substantiated comments and observations about the reasonableness of the use of HVDC technology for the north-south transmission reinforcement.

Response:

CTRC- 3

Preamble: The Alberta Electric System Operator (AESO) is required to plan the transmission system to be able to serve future forecasted generation and loads. The AESO assessed that the load growth in southern and central Alberta is stressing the existing system such that capacity will fall short of reliability requirements by 2014. The AESO 2009 plan forecasts that to meet the long-term system capacity, both north-south transmission lines need to be in place by 2014.

Request:

(a) Provide substantiated comments and observations regarding the reasonableness of the timing of both north-south transmission lines. Comments should address the issues of reliability, line losses, operational flexibility, the cost of energy and long-term development.

Response:

CTRC – 4

Preamble: The *Electric Statutes Amendment Act, 2009* (formerly Bill 50) came into force on December 9, 2009. It approved the need for four critical transmission infrastructure (CTI) projects. It also provided the Government of Alberta the authority to approve the need for future CTI projects, where the Alberta Electric System Operator (AESO) recommends CTI as part of its transmission system plan. The Alberta Utilities Commission (AUC) continues to approve the need for all other transmission facilities. The AUC also continues to approve the location and route of all transmission facilities. The *Electric Statutes Amendment Act, 2009* allows government to approve the need for certain transmission facilities deemed as critical, so that they are built in a timely manner, and the safe, reliable and economic operation of Alberta's electric system is maintained.

Request:

(a) Provide recommendations for any proposed changes to the cabinet powers and the north-south critical transmission infrastructure projects detailed in the *Electric Statutes Amendment Act, 2009* (formerly Bill 50). Include reasons for any proposed changes.

Response:

APPENDIX C

PARTICIPATING ORGANIZATIONS (Solicited)	Written Submission	Presentation
Alberta Association of Municipal Districts and Counties (AAMDC)	✓	
Alberta Chambers of Commerce	✓	
Alberta Direct Connect Consumers Association (ADC)	✓	✓
Alberta Federation of Rural Electrification Associations (AFREA)	✓	✓
Alberta Landowners Council (ALC)	✓	✓
Alberta Urban Municipalities Association (AUMA)	✓	✓
AltaLink Management Ltd.	✓	✓
ATCO Electric Ltd.	✓	✓
ATCO Power Ltd.	✓	✓
Canadian Association of Energy and Pipeline Landowner Associations (CAEPLA)	✓	
Canadian Federation of Independent Business (CFIB)		✓
Canadian Wind Energy Association (CanWEA)	✓	✓
Capital Power Corporation	✓	✓
Central Alberta Rural Electrification Association (CAREA)	✓	✓
Consumers' Coalition of Alberta (CCA)	✓	✓
City of Lethbridge	✓	
EPCOR	✓	✓
ENMAX	✓	✓
Forestry Group	✓	✓
Independent Power Producers Society of Alberta (IPPSA)	✓	✓
Industrial Power Consumers Association of Alberta (IPCAA)	✓	✓
Lavesta Area Group	✓	✓
Municipality of Crowsnest Pass	✓	
Office of the Utilities Consumer Advocate (UCA)	✓	
Oil Sands Developers Group (OSDG)	✓	
Town of Ponoka	✓	
Town of Cardston	✓	
TransAlta	✓	✓
TransCanada	✓	✓
University of Calgary	✓	✓
TOTALS	**29**	**21**

INVITED, BUT DID NOT PARTICIPATE
Balancing Pool
City of Medicine Hat
City of Red Deer
FortisAlberta
Market Surveillance Administrator
Town of Fort Macleod
University of Alberta
University of Lethbridge